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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,944	04/21/2004	Gregory J. Smith	50019.276US01/P05838	7191
23552	7590	02/01/2006	EXAMINER	
MERCHANT & GOULD PC P.O. BOX 2903 MINNEAPOLIS, MN 55402-0903			LAXTON, GARY L	
			ART UNIT	PAPER NUMBER
			2838	

DATE MAILED: 02/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/828,944

Applicant(s)

SMITH, GREGORY J.

Examiner

Gary L. Laxton

Art Unit

2838

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-20 and 29 is/are allowed.
- 6) ☒ Claim(s) 1,2,9-12 and 21-28 is/are rejected.
- 7) ☐ Claim(s) 3-8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments with respect to claims 1, 2, 9-12, 21-23, 25, 27 and 28 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 9-12, 21-23, 25, 27 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee (US 6,987,380).

Claims 1, 2, 9-12, 21-23, and 25; Lee discloses a switched mode power converter that is arranged to provide an output signal to a load circuit, the switched mode power converter comprising: an inductor (590); a switching circuit (580) that is coupled to the inductor and arranged to periodically energize the inductor in response to a control signal (540), wherein the switching circuit is operated in: a closed circuit position during a first operating phase of the converter, and an open circuit position during a second operating phase of the converter; a sense circuit (592) that is arranged to provide a sense signal that is related to a current in the inductor

during a selected operating phase of the converter, wherein the selected operating phase corresponds to one of the first and second operating phases of the converter, and wherein a non-selected operating phase of the converter corresponds to the other of the first and second operating phases of the converter; a feedback circuit (510) that is arranged to provide a feedback signal in response to an output signal ( $V_{out}$  sense) of the converter; a comparator circuit (520) that is arranged to assert a start signal when the feedback signal and the sense signal are approximately equal during the selected operating phase of the converter; and a one-shot circuit (530) that is arranged to initiate the control signal when the start signal is asserted such that the control signal has a variable pulse-width during the non-selected operating phase of the converter.

Claims 27 and 28; Lee discloses a switched mode power converter that is arranged to provide an output signal to a load circuit, the switched mode power converter comprising: an inductor (590); a switching circuit (580) that is coupled to the inductor and arranged to periodically energize the inductor in response to a control signal (540), wherein the switching circuit is operated in: a closed circuit position during a first operating phase of the converter, and an open circuit position during a second operating phase of the converter; a sense circuit (592) that is arranged to provide a sense signal that is related to a current in the inductor during a selected operating phase of the converter, wherein the selected operating phase corresponds to one of the first and second operating phases of the converter, and wherein a non-selected operating phase of the converter corresponds to the other of the first and second operating phases of the converter; an isolation means (580) arranged to isolate the sense means from the inductor during the non-selected operating phase; a comparator circuit (520) that is arranged to assert a

start signal when the feedback signal and the sense signal are approximately equal during the selected operating phase of the converter; and a pulse means (530) for initiating the control signal when the start signal is asserted such that the control signal has a variable pulse-width during the non-selected operating phase of the converter; and feedback circuit (510) that is arranged to provide a feedback signal in response to an output signal ( $V_{out}$  sense) of the converter.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (US 6,987,380) in view of Szepesi (US 4,535,399).

Lee discloses the claimed subject matter in regards to claims 23 and 25 supra, except for adjusting a pulse width associated with a control signal during a selected operating phase of the converter with a phase locked loop.

Szepesi teaches using a PLL to adjust a pulse width from a pulse width modulation circuit by forcing the circuit to initiate the modulating pulses at the load current zero crossing in order to control the flow of energy from the power source to a tuned load.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the circuit of Lee to include adjust a pulse width associated

with a control signal during a selected operating phase of the converter with a phase locked loop in order to force the circuit to initiate the modulating pulses at the load current zero crossing in order to control the flow of energy from the power source to a tuned load as taught by Szepesi.

***Allowable Subject Matter***

6. Claims 13-20 and 29 are allowed.
7. Claims 3-8 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
8. The following is a statement of reasons for the indication of allowable subject matter:

Claim 3; prior art fails to disclose or suggest, inter alia, sense circuit comprising: a resistor circuit that is coupled between a reference terminal and a sense terminal, and a current sense circuit that is coupled to the resistor circuit, wherein the reference terminal is arranged to receive a reference voltage, the resistor circuit has a corresponding resistance value, and the current sense circuit is arranged to provide a sense to the resistor circuit such that the sense signal corresponds to the difference between the reference voltage and a product of the sense current and the resistance value of the resistor circuit.

Claims 4-8; prior art fails to disclose or suggest, inter alia, switched mode power converter of claim 1, the sense circuit comprising; a first resistor that is coupled between the

switching circuit and a supply terminal, a trans-conductance circuit that is arranged to provide a sense current to a sense terminal in response to a voltage across the first resistor, and a second resistor that is coupled between a reference voltage and the sense terminal such that the sense signal corresponds to a voltage associated with the sense terminal.

Claims 13-20; the reasons for allowance for these claims remains the same as stated in the previous office action dated 9/02/2005.

Claim 29; prior art fails to disclose or suggest, inter alia, a sense circuit that is selectively coupled to the inductor during a selected operating phase of the converter, and wherein the sense circuit is decoupled from the inductor during the non-selected operating phase of the converter, wherein the sense circuit is arranged to provide a sense signal that is related to a current in the inductor during the selected operating phase of the converter, wherein the selected operating phase corresponds to one of the first and second operating phases of the converter, and wherein the non-selected operating phase of the converter corresponds to the other of the first and second operating phases of the converter; a diode circuit that is arranged to couple the sense circuit to the inductor during the selected operating phase of the converter, and isolate the sense circuit from the inductor during the non-selected operating phase of the converter.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

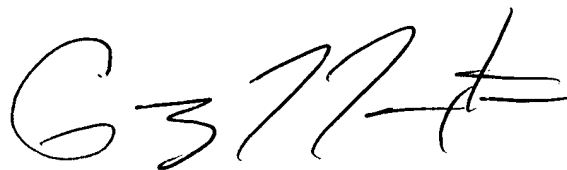
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.



10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary L. Laxton whose telephone number is (571) 272-2079. The examiner can normally be reached on Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Karl Easthom can be reached on (571) 272-1989. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'G377-L', is positioned above the printed name of the examiner.

Gary L. Laxton  
Primary Examiner  
Art Unit 2838

1/27/2006